

Wyoming NASA Space Grant Consortium  
University of Wyoming  
Dr. Paul Johnson  
Telephone Number: 307-766-2862  
Consortium URL: <http://wyomingspacegrant.uwyo.edu/>  
Grant Number: NNX10AO95H

## **PROGRAM DESCRIPTION**

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The **Wyoming NASA Space Grant Consortium** is a Capability Enhancement Consortium funded at a level of **\$430,000** for fiscal year 2011.

## **PROGRAM GOALS**

### ***Outcome 1a: Diversity***

1. **Goal:** Achieve a level of diversity in WY NASA Space Grant Consortium (WSGC) that represents the demographics regarding diversity in Wyoming. **Objectives:** Maintain higher diversity levels than those of the State (12%) or college level (8%).
2. **Goal:** Further develop relationships with underrepresented minority groups and Minority Serving Institutions in WY and outside of the State. **Objectives:** Work with the University's Multicultural Affairs Office to create outreach opportunities. Develop a relationship with Wind River Tribal College through collaboration and communication to provide funding opportunities for Native American students and teachers. Promote WSGC programs and space science awareness through local Hispanic radio station. Develop a relationship with Winston-Salem State University (WSSU), a HBCU; this would benefit both organizations and increase research opportunities for students and faculty.

### ***Outcome 1b: Fellowship/Scholarship***

1. **Goal:** Increase and improve opportunities for research experience and internships for graduate and undergraduate students. **Objectives:** Provide internships and student research opportunities to WY students. Explore internship opportunities with additional aerospace, technology, and STEM-related industries in WY.
2. **Goal:** Encourage and retain college students in STEM majors. **Objectives:** Establish an annual symposium for faculty, fellows, interns, and scholarship recipients to connect, network, and discuss opportunities within STEM majors, graduate programs, fellowships, and careers.
3. **Goal:** Maintain the diversity in fellowship/scholarship programs to greater than or equal to the demographics of enrolled higher education students in the State of WY. **Objectives:** Encourage diversity within programs by instituting seminars in collaboration with the Multicultural Affairs Office and by establishing relationships with Minority Serving Institutions.
4. **Goal:** Recruit community college students to get involved in Undergraduate Research Fellowships and WSGC programs. **Objectives:** Provide access to fellowship and scholarship information for all students in WY by increasing the affiliates to include each institution of higher education. Advertise

opportunities for students at the CC's, such as the CC STEM and CC Transfer Scholarships and Undergraduate Research Fellowships.

5. **Goal:** Support STEM workforce development in WY through real-life, hands-on experiences. **Objectives:** Provide internships and student research opportunities to WY students.

***Outcome 1c: Research Infrastructure***

1. **Goals:** Increase awareness of and continue to develop Research Infrastructure programs. **Objectives:** Provide infrastructure funding, especially seed grants, to faculty that have the potential to develop into larger funded research projects. Fund faculty research that will be likely to develop substantial projects of NASA interest. Inform researchers of available WSGC and external NASA opportunities by providing updates on NASA solicitations and other funding opportunities through e-blasts to students, faculty, and affiliates. Support Undergraduate Research Day in Laramie. Provide travel funding for faculty or students to present at NASA or other scientific conferences.
2. **Goals:** Build partnerships between industry, government, and academia. **Objectives:** Develop new and stronger partnerships with industry, government, and academia to create internships and hands-on research opportunities.
3. **Goals:** Develop the interdisciplinary nature of the Research Infrastructure program. **Objectives:** Bring speakers to WY to talk about their research in NASA supported areas. Emphasize focus on interdisciplinary proposals.

***Outcome 1d: Higher Education***

1. **Goals:** Increase opportunities in STEM education at the college level. **Objectives:** Increase the number of Faculty Education Enhancement Grants.
2. **Goals:** Expose students to scientific research and hands-on experiences to engage their interest and encourage workforce development. **Objectives:** Encourage development of new college-level courses and provide support for courses that provide hands-on student experiences, such as RockOn or BalloonSat courses.
3. **Goals:** Create additional opportunities for STEM teacher training and in-service professional development. **Objectives:** Provide funding for in-service teacher professional development related to RockOn or Balloon Sat programs. Encourage pre-service teacher training at the Casper Planetarium summer Astronomy Workshop and after-school teacher training program.
4. **Goals:** Further develop relationships with underrepresented students and Minority Serving Institutions. **Objectives:** Partner with the Multicultural Affairs Office to institute seminars and develop relationships with Minority Serving Institutions.

***Outcome 2a: Precollege Education***

1. **Goals:** Increase interest in STEM majors and careers. **Objectives:** Continue to support and grow Women in Science (WIS). Provide support to AstroCamp in Laramie, WY—a 10-day science and astronomy camp for middle-school students and teachers by providing teacher professional development. Encourage teacher involvement in robotics programs through funding opportunities. Provide support and funding for State Science Fair. If appropriate, WSGC will partner with various state entities to develop a NASA Aerospace Scholars program for WY.
2. **Goals:** Inform students and families about opportunities in STEM education and research. **Objectives:** Provide information about WSGC programs and activities to libraries, museums, science centers, WY Science Teacher Association, and online.
3. **Goals:** Distribute NASA and STEM resources to WY teachers and students. **Objectives:** Refurbish, update and create new Space Trunks. Increase awareness and support for the WY NASA Educator Resource Center (ERC) through funding & advertisement. Support teacher involvement in STEM-related events or workshops, and provide funding for classroom materials.

***Outcome 3a: Informal Education***

1. **Goals:** Increase museum outreach and partnerships. **Objectives:** Develop a portable Space Shuttle display for traveling exhibits. Provide funding for institutions to develop STEM-related displays. Encourage affiliates to create one program a year onsite for regional activities.
2. **Goals:** Establish new relationships with informal science education institutions in WY. **Objectives:** Establish relationships with Astronomy Clubs to offer support for events. Partner more closely with informal education facilities to offer hands-on space science activities.

## **PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, OR 3)**

### **OUTCOME 1**

**Graduate Research Fellowships** – In 2011, four graduate fellowships were awarded. Brady Foreman, a PhD fellow submitted the results of his research to *Nature* and his manuscript was accepted with minor revisions and will be published in 2012. This is a huge accomplishment for a graduate student. Brady is currently pursuing postdoc and faculty positions. Reilly Dibner, another PhD fellow had a very successful year and will be funded next year by an NSF GK12 fellowship. The NSF GK12 fellows engage in K12 science education outreach and Reilly will visit junior high and high school classrooms across Wyoming next year bringing her research to students and teachers.

**Undergraduate Research Fellowships** – Space Grant funded a total of 11 undergraduate research fellowships in 2011 (Spring and Fall). Rachel Smullen was awarded an Undergraduate Research Fellowship this year for her work on radial velocity measurements of stars. She was also awarded an internship at a NASA Center for summer 2012. Rachel will be funded in 2012 with an Undergraduate Research Fellowship and hopes to collaborate with NASA Kepler scientists to perform follow-up spectroscopy that is needed for the project. She discussed this idea with one of the scientists working on the Kepler Mission at the AAS meeting in January and is pursuing the idea. The Wyoming Infrared Observatory (WIRO) is ideally suited to observing the Kepler planetary candidates and confirming the presence of planets. At UW, Rachel will have nearly unlimited use of WIRO, a 2.3 meter telescope. In the end, all data will be sent back to the Kepler science team to assist in their confirmation and characterization of exoplanets. This is a great collaboration with NASA initiated by an undergraduate student. During 2011, we also funded Veronica Malone, a student at Central Wyoming College, a community college. Several other undergraduate fellows have been accepted into graduate school for Fall 2012.

**Community College STEM Scholarships** – The number of community college student awardees in 2011 is 52 to date: 21 women (40%), three underrepresented minorities (6%), and two disabled students (4%). Northern Wyoming Community College District has not submitted scholarship data yet.

**Community College Transfer Scholarships** – Four scholarships were awarded to STEM students transferring to the University of Wyoming (the only 4-year university in the state) from Wyoming community colleges. Three of the students who received transfer scholarships also received previous Space Grant funding. Alex Young received a CC STEM Scholarship in 2009 and 2010. Justin Wood received a CC STEM Scholarship in 2011 and Cheryl Veggian was funded through a Faculty Research Grant.

**Student Internships** – One Wyoming student participated in an internship at JSC in 2011. Zohreh Souiri was a graduate student at the time of her internship and has since graduated. She is pursuing a career in aerospace.

**Student Moonbuggy Competition** - Four students from UW participated in the Moonbuggy competition this year. The Moonbuggy was constructed for their Engineering Senior Design class and UW placed 6th at the competition in April.

**Faculty Research Initiation Grants** - Three grants were awarded to faculty, two at the University of Wyoming and one at Western Wyoming Community College.

**Speaker Series** – In 2011, WSGC helped sponsor 12 speakers at the University of Wyoming for UW Department of Physics & Astronomy Colloquia.

**Undergraduate Research Day** - WSGC co-sponsors this campus-wide event, which was held on April 21st, 2012 to showcase undergraduate research done at UW and Wyoming community colleges. Most WSGC Undergraduate Research Fellows presented their research at the event. Attendance was close to 300 students.

**Travel Grants for Scientific Conferences** – WSGC awarded 33 travel grants this year to students traveling to scientific conferences, science competitions, or engaged in research. This is great experience for students to present their work at national conferences or event.

**Faculty Education Enhancement Grants** - Three grants were provided to support faculty members at UW and Wyoming community colleges to develop new college courses in STEM fields. Particular interest was given to interdisciplinary courses. Two awards went to community college faculty.

**Student Satellite Building – Rocket Class** - In 2011, Space Grant Director Dr. Paul Johnson, hosted a year-long Rocket Science class with 12 students. Students designed a rocket payload that will be launched at Wallops in summer 2012.

**Astronomy Workshop for Pre-service Teachers** – The astronomy workshop held at Casper College is a collaboration between the college and Casper Planetarium. The workshop provides professional

development opportunities for pre-service middle and high school STEM teachers. During the school year, pre-service teachers continue their training by participating in an afterschool science club. In 2011, two pre-service teachers will be funded with augmentation funding and reported as such.

**Student Organizations** – No funding was given to student organizations in 2011.

**Minority Serving Institutions** - During FY2011, WSGC partnered with WSSU, a HBCU to provide summer research fellowships for four WSSU students at UW. Funding will be provided by FY2011 augmentation funding and will be reported at a later time.

### **OUTCOME 2**

**Teacher Educational Resources** – In 2011, the Space Trunks were shipped out 15 times to schools throughout the State. Space Grant has developed a new Telescope Trunk and is working on a new Wind Energy Trunk. In addition, Space Grant provided a fall professional development workshop for 5 in-service and 20 pre-service teachers, led by NASA AESP Tony Leavitt. Ten STEM-related events were sponsored for teachers in WY. Space Grant will also participate in the Wyoming Science Teacher Association meeting held in Casper, WY and participates in the Wyoming Afterschool Alliance programs.

**Wyoming Astrocamp for Teachers** – Space Grant supports the Exxon Mobile Bernard Harris Summer Science Camp (Wyoming Astrocamp) by providing administrative help and teacher stipends for middle and high school STEM teachers instructing at the camp. Teachers work with UW faculty to develop curriculum and learn about astronomy research during the camp. Two teachers will be supported in FY2011 on augmentation funding.

**Robotics Competition Support** – In FY2011, WSGC supported five robotics programs from across the state; teams in Casper, Big Piney, Carpenter, and Jackson Hole, WY. This support provided funding for the FIRST LEGO League State Competition, travel, and supplies for teams. Between the five programs, eight teams were supported.

**NASA Educator Resource Center Support** – In FY2011, WSGC did not provide funding to the NASA ERC. All of the NASA materials available at the ERC are now available to teachers throughout WY through the UW Library system.

**Women in Science** - In May 2012, WSGC hosted the 13th annual Women in Science Conference at the UW campus. The conference is designed to increase interest in science and technology careers and promote a positive image of science careers for youth. It also provides role models for young women and gives them information about college. Close to 400 students and 50 presenters participated in this year's event.

**State Science Fair** - WSGC supports science fair and provides awards to NASA related projects. This year, 411 students attended State Science Fair and 16 NASA special awards were given out.

**NASA Aerospace Scholars Program** – WSGC has decided not to pursue a NASA Aerospace Scholars Program at this time. The Space Grant contact and partner at the WY Department of Education left his position, making organization and funding of the program more difficult.

### **OUTCOME 3**

**Museum/Library/Planetarium Support** – In FY2011, WSGC did not provide funding for museum, library, or planetarium support in Wyoming, although we are working to develop new partnerships.

## **PROGRAM ACCOMPLISHMENTS**

### **OUTCOME 1**

**Goal:** Increase and improve opportunities for research experience and internships for graduate and undergraduate students.

- Eleven undergraduates were funded to work on research projects through Undergraduate Research Fellowships (Spring and Fall). Four graduate students were given graduate assistantships to work on research projects through Graduate Research Fellowships.
- One student spent the summer at a NASA Center for an internship at JSC.
- Four students received fellowships to design and fabricate this year's Moonbuggy and 12 students participated in the Rocket Science course at UW, designing a rocket payload.

**Goal:** Encourage and retain college students in STEM majors.

- Information was distributed to encourage students to apply for fellowships and scholarships through e-mails, the website, public radio announcements, posters, and career fairs. Longitudinal tracking of student awardees continues.

- Regular correspondence was maintained with all CC affiliates in addition to two consortium meetings this year. This year, three affiliates attended National Space Grant meetings. Affiliates advertise programs at their colleges.
- Several networking lunches were held with undergraduate and graduate fellows, transfer scholarship recipients, Moonbuggy and Rocket teams, and student interns.
- A Friday night pizza party was held the night before Undergraduate Research Day in collaboration with NSF EPSCoR, NIH INBRE, and the McNair Scholars Program. Several Space Grant students attended.

**Goal:** Maintain the diversity in fellowship/scholarship programs to greater than or equal to the demographics of enrolled higher education students in the State of WY.

- The Multicultural Affairs Office publicizes our opportunities in their newsletter.
- Out of 75 fellowship and scholarship recipients awarded thus far 30 were female (40%) and six were from underrepresented groups, including disabled students (8%). The student intern in 2011 was female.
- Of the six Faculty Education and Research grant proposals funded, three went to female faculty members (50%). Of the 27 Faculty Education and Research grant proposals received, only one was from a group underrepresented in the sciences (1 disable applicant, 4%).

**Goal:** Recruit CC students to get involved in Undergraduate Research Fellowships and WSGC programs.

- In 2011, WSGC had a student from Central Wyoming College receive an Undergraduate Research Fellowship. Four CC Transfer Scholarships were given to students transferring from a CC to UW. Three of these students had previously participated in Space Grant programs at their CC.
- CC affiliates advertise all WSGC programs and run their own CC STEM Scholarship programs. All CC's in WY are members of the consortium.

**Goal:** Support STEM workforce development in WY through real-life, hands-on experiences.

- As mentioned above, 11 undergraduates received Undergraduate Research Fellowships, four graduate students received Graduate Research Fellowships, one student did an internship at a NASA Centers, four students were part of the Moonbuggy Team, and 12 students participated in the Rocket Science Course. All of these students were involved in hands-on research and/or real-life engineering experiences.

**Goals:** Increase awareness of and continue to develop Research Infrastructure programs.

- Research grant opportunities were publicized through a variety of means, including: e-mail, webpage, posters, and public radio announcements. A total of 15 proposals were received in FY2011 (up from 14 in 2010) and three awards were made. Information on resulting publications and new proposals submitted is not available at this time.
- NASA Research Opportunities were publicized as they were received.
- 33 travel awards have been made to date in FY2011 to students presenting at scientific conferences, engaged in research, or attending student engineering competitions.

**Goals:** Build partnerships between industry, government, and academia.

- Space Grant continues to work with Firehole Composites, a local software engineering company based in Laramie, WY. WSGC continues to work with WSSU, a HBCU, to provide summer research fellowships for students underrepresented in science. UW and WSGC are also pursuing partnerships with Hampton University and Jackson State University, also HBCUs. During the 2010 Summer of Innovation, Space Grant partnered with the WY Department of Education and continued that partnership for programs in 2011. All of these partnerships have resulted in hands-on research and educational experiences for students and teachers.

**Goals:** Develop the interdisciplinary nature of the Research Infrastructure program.

- WSGC helped bring 12 speakers to Wyoming in FY2011.
- Research proposal reviewers felt that two of the three faculty research proposals funded in FY2011 were highly interdisciplinary in nature (67%) and one was somewhat interdisciplinary (33%); overall 100% of projects were found to be at least somewhat interdisciplinary in nature.

**Goals:** Increase opportunities in STEM education at the college level.

- Three Faculty Education Enhancement grants were made in 2011, which resulted in three new or updated courses.

**Goals:** Expose students to scientific research and hands-on experiences to engage their interest and encourage workforce development.

- Three new courses were developed from Faculty Education Grants and the Rocket Science course continues to be a popular class.

**Goals:** Create additional opportunities for STEM teacher training and in-service professional development.

- WSGC hosted a balloon satellite workshop in October 2011 with StratoStar, a company that provides training to start balloon satellite programs. There has been great interest in starting a balloon satellite program in Wyoming, which we will focus on in 2012.
- In FY2011, two pre-service teachers will participate in the Astronomy Workshop at Casper College, which provides professional development opportunities for pre-service middle and high school STEM teachers. During the school year, the pre-service teachers continued their training by participating in an afterschool science club. This will be funded with augmentation funding.

**Goals:** Further develop relationships with underrepresented students and Minority Serving Institutions.

- Space Grant has started a partnership with WSSU, a historically black college in North Carolina. In summer 2010, five WSSU students participated in a summer research fellowship at the University of Wyoming under the mentorship of UW graduate students; 3 in summer 2011 and 4 in summer 2012. This will be funded with FY2011 augmentation funding.
- WSGC continues to work with the Multicultural Affairs Office on campus and advertises all fellowship, scholarship, and grant opportunities in their weekly newsletter.
- WSGC continues to look for opportunities to partner with the Wind River Tribal College.
- Associate Director, Dr. Shawna McBride now serves on the Strategic Diversity Initiatives Committee at UW, which promotes the goals listed above.

## **OUTCOME 2**

**Goals:** Increase interest in STEM majors and careers.

- Attendance at the UW Women in Science Conference in May was close to 400 students and 35 teachers. Of the student registrations, 95% were female and 16% were from underrepresented groups. A Women in Science event will also be held in Riverton, WY with approximately 300 students and teachers (estimated 25% underrepresented).
- WSGC also supports the Exxon Mobile Bernard Harris Summer Science Camp (Wyoming Astrocamp). The camp has grown from around 20 students to 48 students (50% female, 21% underrepresented). WSGC supports teacher stipends for the camp. This will be funded by augmentation funding in FY2011.
- WSGC supported five robotics programs and eight robotics teams in 2011, providing teachers funding for supplies and travel.
- WSGC supported State Science Fair, giving out 16 NASA special awards.

**Goals:** Inform students and families about opportunities in STEM education and research.

- WSGC has a presence at many public events, including: State Science Fair, career fairs, teacher conferences/workshops, and Women in Science conferences. All information about programs is available online. Through continued networking, several new partnerships have been developed (WY Afterschool Alliance, Tate Museum, and Challenger Learning Center in CO) that will help to promote WSGC programs.

**Goals:** Distribute NASA and STEM resources to WY teachers and students.

- Use of the Space Trunks increased by over 50% from FY2009-FY2010 and has remained steady since then. WSGC has added an additional Telescope Trunk and is developing a Wind Energy Trunk to be sent around the State.
- In Fall of 2011, WSGC hosted a teacher professional development workshop for 5 in-service and 20 pre-service teachers led by NASA AESP Tony Leavitt.
- WSGC continues to support the NASA ERC on the UW campus. The collection of NASA materials is now cataloged, so people can search for items on the UW Library system. This resource is advertised at the Wyoming Science Teacher Association meeting.
- In FY2011, WSGC supported teacher involvement in 8 STEM-related events: 1-2) Astro-Science camp near the Wind River Reservation – Summer 2011 and 2012; 3) Professional development MS credits for Victoria Davis, middle school math and science teacher in Kaycee, WY; 4) Support for Mills Spring Ranch Residential Field Experience on Casper Mountain for 15 students, 2 teachers, and 4 chaperones; 5) Casper Regional Science Fair; 6) Purchase of an infrared camera to be used for educational outreach at Casper Planetarium; 7) Funding for supplies and travel for the

- Cheyenne, WY Team America Rocketry Challenge (TARC) East High School Team; and 8) Funding for supplies for engineering kits for a local afterschool program.
- In FY2011, WSGC provided two STEM-related activities: 1) Science Night at Beitel Elementary School in Laramie, WY – taught by WSGC Associate Director, Dr. Shawna McBride and Program Coordinator, Michele Turner; and 2) Summer Science Institute, a 3-day science camp at Sheridan College for 24 middle school students – taught by WSGC Associate Director, Dr. Shawna McBride.
- NASA and STEM resources are also delivered through participation in the Wyoming Science Teacher Association Meeting and through the WY Afterschool Alliance.
- Associate Director, Dr. Shawna McBride is also now on the steering committee for CSI-WY, whose focus is to promote and coordinate all UW K-12 science outreach activities in Wyoming.

### **OUTCOME 3**

**Goals:** Increase museum outreach and partnerships.

- WSGC is working with the UW Geology Museum to incorporate Space Science displays into their collection. Currently there is a meteorite display, which we plan to update/expand. Students from the Rocket Science class are also planning a Rocket – Space Science display in the museum.
- We have acquired a Space Shuttle tile and would like to get more memorabilia to put together a Space Shuttle traveling display that can be sent around the State.

**Goals:** Establish new relationships with informal science education institutions in WY.

- WSGC Associate Director, Dr. Shawna McBride is on the Board of the Wyoming Afterschool Alliance. Through this partnership WSGC has direct access to afterschool programs in WY.
- We continue to work with the Casper Planetarium to support K-12 educational opportunities.
- WSGC is exploring opportunities with the Challenger Learning Center in Colorado Springs, CO.
- The Tate Museum at Casper College participated in Women in Science this year and would like to become more involved in the future.

## **PROGRAM CONTRIBUTIONS TO PART MEASURES**

- **Student Data and Longitudinal Tracking:** Total awards = 199 (FY2006-2011); Fellowship/Scholarship = 167, Higher Education/Research Infrastructure = 32; 23 of the total awards represent underrepresented minority (19) or disabled (4) students. Five students have accepted STEM positions in an aerospace industry, 53 students have accepted STEM positions in non-aerospace fields (including academic fields), while 44 have graduated and are pursuing advanced STEM degrees.
- **Diversity:** The members of our consortium include the University of Wyoming, all of the community colleges in Wyoming, industry partners, government partners, and K-12 educational partners. In addition, we have started a partnership with Winston-Salem State University, an HBCU. In FY 2011, we funded six faculty awards: 3 Faculty Research grants and 3 Faculty Education grants. 50% of the awardees were female. No awards were given this year to faculty underrepresented in the sciences and this is due in large part to the lack of applicants who would fall into this category; of the 27 Faculty Education and Research grant proposals received, only one was from a group underrepresented in the sciences (1 disabled applicant, 4%). In regards to the students funded in FY 2011, we provided funding for: 4 graduate students, 11 undergraduate research fellowships (Fall and Spring), 1 internship, 4 Moonbuggy participants, 12 Rocket Science participants, 4 community college transfer students, and 52 STEM scholarships to students at community colleges, for a total of 88 awards. Of the 88 students funded, 35% were female and 6% were students underrepresented in the sciences (3% minorities and 3% disabled students). In looking at the student tracking data for all of the students who have received significant awards through Wyoming NASA Space Grant since FY2006, 26% were female and 12% represent underrepresented groups.
- **Minority-Serving Institutions:** WSGC has started a partnership with WSSU, a historically black college in North Carolina. In summer 2010, five WSSU students participated in a summer research fellowship at the University of Wyoming under the mentorship of UW graduate students. In summer 2011 three WSSU students came to Wyoming and in summer 2012 four WSSU students will be

engaged in summer research fellowships. In March 2011, Dr. Shawna McBride traveled to WSSU to meet with students and faculty. This increased applications to the program dramatically. This trip was funded by the UW Diversity Office. WY Space Grant is also exploring partnerships with Jackson State University and Hampton University, also HBCUs. Funding for this program comes from WY NASA Space Grant, the UW School of Energy Resources, the UW Diversity Office, and an NSF GK12 grant – it has been a great collaboration.

- **NASA Education Priorities:**
  - Authentic, hands-on student experiences in science and engineering disciplines – the incorporation of active participation by students in hands-on learning or practice with experiences rooted in NASA-related, STEM-focused questions and issues; the incorporation of real-life problem-solving and needs as the context for activities.
    - At the college level, WSGC provided several hands-on, research and engineering experiences for students in FY2011 related to NASA goals: 4 Graduate Research Fellowship, 11 Undergraduate Research Fellowship, 1 NASA Center Internship, 4 student participants on the NASA Great Moonbuggy Race Team, and 12 student participants in RockSatX. Additionally, in Summer 2012 four WSSU students will be supported for Summer Research Fellowships – to be reported with the FY2011 Augmentation Funding.
    - At the K-12 level, WSGC also supports several activities that get students and teachers involved in hands-on activities including: State Science Fair, funding for robotics programs, Women in Science, AstroCamp, and by providing educational resources to teachers.
  - Engage middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. Capabilities for teachers to provide authentic, hands-on middle school student experiences in science and engineering disciplines.
    - During FY2011, WSGC sent out Telescope and Rocket Space Trunks containing NASA curriculum to K-12 STEM teacher in the state 15 times. WSGC also hosted a teacher professional development workshop in Fall 2011 with NASA AESP Tony Leavitt, which was attended by 25 in-service and pre-service teachers. In addition, WSGC supported 10 STEM activities for teachers in FY2011 to help teachers provide hands-on activities for students.
  - Summer opportunities for secondary students on college campuses with the objective of increased enrollment in STEM disciplines or interest in STEM careers.
    - In May 2012, WSGC hosted the 13th annual Women in Science conference at the University of Wyoming. This year we had close to 400: 7-12th grade students in attendance. This conference provides students the opportunity to visit a college campus and learn about careers in STEM.
    - In June 2012, WSGC will help with the Exxon Mobile Bernard Harris Summer Science Camp for middle school students. The 48 campers will stay in the UW dorms for 10 days and learn about research and careers in space-related areas. WSGC provides administrative help and teacher stipends for the camp, which will be reported on FY2011 augmentation funding.
    - In July 2011, WSGC continued its Summer of Innovation program with a small camp held at the University of Wyoming. We had two teachers and 13 students in junior high and high school.
  - Community Colleges – develop new relationships as well as sustain and strengthen existing institutional relationships with community colleges.
    - All of the Wyoming community colleges are now members of the WSGC. Each college has a representative that attends the WSGC Board Meeting in the Fall and Spring. The community colleges help to advertise WSGC programs to their students and faculty.
    - Each college runs their own scholarship program for CC STEM students.
    - In October 2011, we hosted a balloon satellite workshop at Central Wyoming College. We are currently working on starting a balloon satellite program in Wyoming that will be led and organized by the community colleges in partnership with UW and local high schools.



- In FY2011, 4 community college students received Community College Transfer Scholarships, 52 students thus far have received CC STEM scholarships, 1 CC student received an Undergraduate Research Fellowship, 1 CC faculty member received a Faculty Research Grant, and 2 CC faculty members received Faculty Education Grants.
- Aeronautics research – research in traditional aeronautics disciplines; research in areas that are appropriate to NASA's unique capabilities; directly address the fundamental research needs of the Next Generation Air Transportation System (NextGen).
  - Zohreh Souri spent the summer of 2011 at JSC as an intern. Her research involved designing and optimizing magnetic shielding for space vehicles.
- Environmental Science and Global Climate Change – research and activities to better understand Earth's environments.
  - In FY2011, we supported 8 students and faculty involved in environmental science and/or global climate change science: 3 undergraduate projects, 3 graduate projects, 1 faculty research project, and 1 faculty education project.
- Diversity of institutions, faculty, and student participants.
  - Reported on above.
- Enhance the capacity of institutions to support innovative research infrastructure activities to enable early career faculty to focus their research toward NASA priorities.
  - In FY2011, WSGC provided three Faculty Research Initiation grants. These grants are intended as seed funding for early career faculty, faculty at community colleges, and faculty members making a dramatic departure from their current research. All of the research is directed at NASA goals and priorities. The seed funding is given to new faculty members or faculty changing their research direction to help them develop data that can then be used to apply for larger grants: NASA, NSF, NIH, etc.

## IMPROVEMENTS MADE IN THE PAST YEAR

Space Grant has continued to develop its management strategy and network. All community colleges in the state are now part of the Space Grant Consortium. In the Fall, WSGC added a Program Coordinator who will work 1/4 time for Space Grant and 1/4 time for NASA EPSCoR, facilitating cooperation between those two programs. Over the past year, Space Grant has strengthened its partnership with WSSU, a HBCU, to help increase program diversity and diversity within the WY educational system. Associate Director, Dr. Shawna McBride visited WSSU to meet with students, faculty, and administrators at the school. Additionally, Shawna now serves on the Strategic Diversity Initiatives Committee at UW and is helping to develop strategies for partnering with HBCUs. Partnerships with other UW programs, including the UW Diversity Office, the Science Posse (an NSF GK12 funded program), and the School of Energy Resources are helping to defer costs for this program. WSGC is also exploring partnerships with other HBCUs, including Hampton University and Jackson State University. WSGC is partnering with the Science Posse, an NSF GK12 funded program, and the NASA AESP to provide teacher professional development workshops. In October, Space Grant hosted a balloon satellite workshop for UW and community college faculty. There was a great deal of interest in starting a balloon satellite program in Wyoming, so we are working with StratoStar Systems Inc. to provide supplies and support for a program. We have assembled a balloon satellite subcommittee to begin planning the program for next year. We hope to involve high schools, community colleges, and UW students and faculty in the program. In summer 2010, WSGC received a Summer of Innovation grant that supported 10 four-week summer camps focused on climate, climate change, and alternative energy – specifically wind energy. Space Grant will continue this program on a smaller scale in summer 2012 with internal funding. We have assembled a subcommittee to discuss future plans for the SOI summer camp, which may include hosting it in different locations each year to provide students from around the state an opportunity to participate. Finally, we are meeting on a regular basis with other programs at UW who have similar goals, so we can partner on marketing and other opportunities. These programs include: NSF EPSCoR, NIH INBRE, and the McNair Scholars Program.

## PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

- **University of Wyoming:** 4-year university. Location of the WSGC offices. Involved in Undergraduate and Graduate Fellowships, Faculty Research and Education Grants, NASA internships, and community college transfer scholarships;
- **Casper College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Central Wyoming College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Eastern Wyoming College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Laramie County Community College – Laramie County Campus:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Laramie County Community College – Albany County Campus:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Northern Wyoming Community College District – Sheridan College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Northern Wyoming Community College District – Gillette College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Northwest College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Western Wyoming Community College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Embry-Riddle Aeronautical University:** military college, offers some undergraduate classes and some master's level classes. Involved in Faculty Research and Education Grants.
- **90<sup>th</sup> Space Wing, F.E. Warren Air Force Base:** air force command located in Wyoming, includes the Inter-Continental Ballistic Missile Museum and interest in rocketry informal education programs.
- **Wickman Spacecraft and Propulsion, Co.:** industry affiliate, they design and produce small solid rocket motors used in some defense missiles and other satellite programs.
- **Casper Planetarium:** informal education affiliate, associated with the K-12 school district in Casper, WY, hold astronomy events for the general public, workshops for teachers and students.